# **Fact Sheet**

### FIELD SCREENING METHODS FOR EXPLOSIVES IN SOILS

### **PROBLEM**

One of the most serious environmental problems at many U.S. Army installations is the presence of soil contaminated with munitions residues. This contamination has occurred during the last 50 years due to waste discharges from munitions manufacture and the destruction of out-of-date or off-specification material.

The most common residues contain 2,4,6-trinitrotoluene (TNT), hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), and associated impurities and environmental transformation products. Unlike many other pollutants, TNT and RDX have little affinity for soils and rapidly migrate to produce groundwater pollution.

In order to eliminate this pollution, contaminated soils first must be located and characterized. Until recently this was done exclusively by sending soil samples to off-site laboratories for analysis. While the quality of this data was generally acceptable, it often took weeks or months to receive the data, resulting in long project delays. In addition, most of the soils tested blank, wasting Army resources and reducing the ability to accurately delineate the boundaries of contaminated soil.

#### **SOLUTION**

CRREL developed low-cost field screening methods for TNT, RDX, and DNT (dinitrotoluene) in soil. These methods involve solvent extraction followed by simple chemical reactions that produce intensely colored solutions if these munitions chemicals are present. Detection can be made visually, or semi-quantitative results can be obtained with a field-portable spectrophotometer. Analytical results correlate well with those from the standard laboratory method. These methods have been successfully demonstrated at a number of Army sites. Test results are avail-able to site investigators in near-real time, allowing on-site decisions and judicious selection of samples for more rigorous laboratory analysis. The TNT method has been adopted by the U.S. EPA as Draft SW846 Method 8515; a commercially available kit based on this work is now available through the EnSys Corporation located in North Carolina. A recent evaluation of field screening kits by the EPA determined that this method was the cheapest, most accurate, and the overall preferred field method for TNT.

## **CONTACT**

Thomas F. Jenkins 603-646-4385 tjenkins@crrel.usace.army.mil

Marianne E. Walsh 603-646-4666 marianne@crrel.usace.army.mil

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